San Mateo County
Energy – Water Snapshot

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Introduction

This snapshot on water and the energy-water connection will cover the following three topics: (1) a general overview of water usage in San Mateo County, (2) the concept of energy intensity, and (3) opportunities for reducing energy and water consumption.

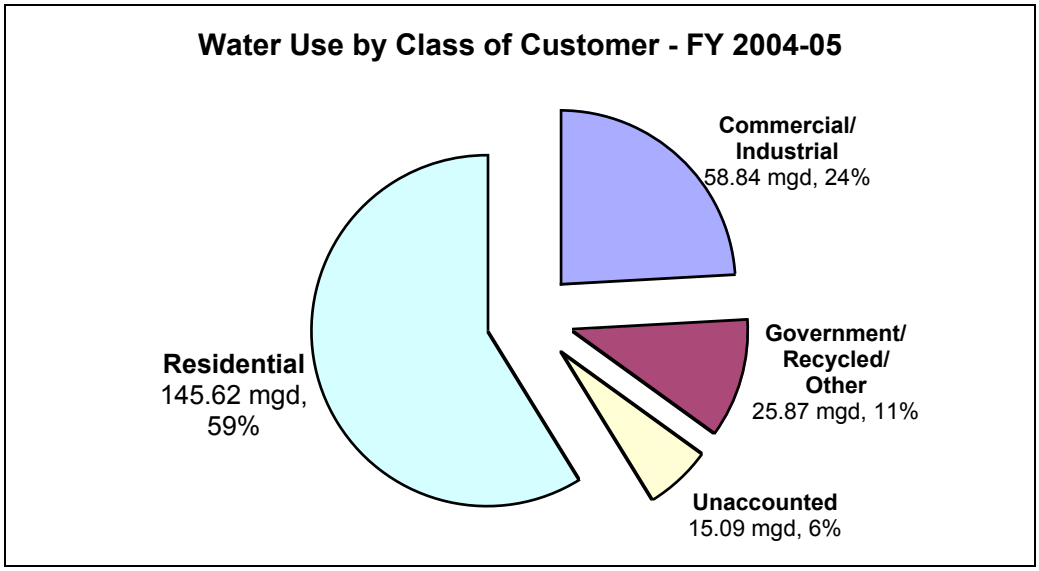
San Mateo County Water - Source

Ninety-three percent (93%) of the county's water comes from the Hetch Hetchy Reservoir in Yosemite National Park. This reservoir is fed by snowmelt from the Sierra Nevada Mountains. The remaining six percent (6%) comes from groundwater, which is fed by rain percolating through the soil.

Reduced snowfall and/or any prolonged droughts caused by climate change will decrease water availability. Increased urbanization, including roads and large buildings (impermeable surfaces), can divert rainwater into storm drains instead of allowing it to recharge the groundwater levels at the site unless careful attention is paid to stormwater management practices. Groundwater overuse – pumping more water out of underground aquifers than is being recharged into them – can reduce the amount of storage capacity for these reservoirs and increase the possibility of salt water intrusion or contamination and render well water unusable.

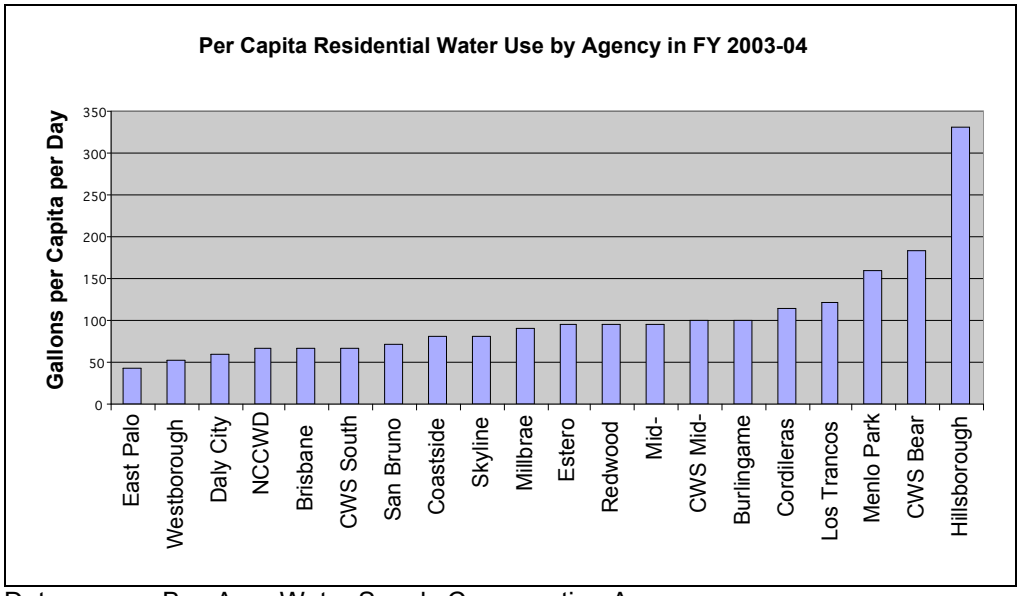
San Mateo County Water – Consumption

According to the 2006 Sustainable San Mateo County Indicators Report, San Mateo County uses about 99 million gallons of water per day, an amount that is expected to increase by 1.1% each year through 2030. The following chart breaks down water use by customer class.



Data source: Bay Area Water Supply Conservation Agency

The most affluent communities use the greatest amount of water residentially and a higher proportion of their water use is for landscaping. For instance, homes in the California Water District – Bear Gulch (which includes Atherton) use as much as 62% of their water for outdoor use. East Palo Alto residents use only 11% of their water outdoors and all the other communities fit somewhere between these two extremes.



Data source: Bay Area Water Supply Conservation Agency

The Energy-Water Connection

The electricity industry is second only to agriculture as the largest user of water in the United States. Electricity production from fossil fuels and nuclear energy accounts for 39% of all freshwater withdrawals in the nation (USGS)! Fortunately, the majority of San Mateo County's electricity is generated by hydro or pumped storage.

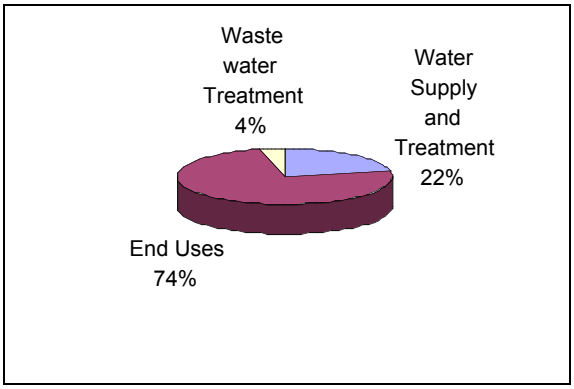
The term *energy intensity* is "defined as the amount of energy consumed per unit of water to perform water management-related actions such as desalting, pumping, pressurizing, groundwater extraction, conveyance and treatment – for example, the number of kilowatt hours consumed per million gallons (kWh/MG) of water." (CEC, p.4)

The energy intensity of the water of San Mateo County is below the California average for two reasons: (1) our water supply is gravity fed from the Sierras, reducing the need for pumping and conveyance, and (2) water from Hetch Hetchy is pristine and requires less treatment.

The data in the following charts shows how much electricity is used to supply water to the consumer, for the consumer to use the water, and the wastewater treatment. Total water-related electricity use is estimated at 19 percent of all electricity used in California. Not shown on this graph is the fact that 30% of California's natural gas use is related to water.

Water-Related Energy Use in California in 2001

	Electricity (GWh)
Water Supply and Treatment	
Urban	7,554
Agricultural	3,188
End Uses	
Agricultural	7,372
Residential	27,887
Commercial	
Industrial	
Wastewater Treatment	2,012
Total Water Related Energy Use	**48,012**
Total California Energy Use	**250,494**
Percent	**19%**



1 GWh = 1,000 MWh or 1,000,000 KWhs.

2001 California Energy Consumption by End Use Report

Opportunities to focus on water reduction *in order to reduce energy demands.*

When we view water conservation from an energy standpoint, the focus for reduction may be slightly different than simply reducing water consumption for water conservation goals. Some gallons of water require more energy (higher energy intensity) than others. Plus, there are a few changes in water consumption and treatment patterns that may affect electricity use. For instance, we should be aware of these facts:

- Agricultural use is less energy intensive than urban uses because it does not require treatment after use. Therefore, saving a gallon of irrigation water does not give us the same energy savings as saving a gallon of urban water.
- If diesel irrigation pumps are used on farms in San Mateo County, recent air quality incentives to switch to electric pumps could increase electricity needs.
- New water quality regulations for wastewater may increase energy demand.
- Recycled water is the least energy intensive of all sources of water; expansion of this usage could offer significant energy savings.
- In urban consumption, the most energy intensive use is hot water because it requires additional energy to heat the water. Therefore, increasing efficiency and conservation of hot water is an effective step in decreasing energy intensity per gallon used. (Good focus for residential incentives related to energy).

As the USTF moves forward with an Energy Strategy for San Mateo County, energy intensity of water uses should be considered as one of the factors in determining which programs/incentives/actions to do. Costs, potential reduction volumes and ease of implementation are other considerations. Any new equipment, infrastructure or processes

being designed and implemented at the utility level (conveyance, treatment) should include energy efficiency and reduction in the decision process.

And finally, water utilities should be encouraged to investigate and pursue increased electric generation that is related to the process – biogas conversion at wastewater treatment plants or in-conduit hydropower – and to consider installation of renewable energy options on their lands and buildings.

The state water plan is a good document for more in-depth understanding. This report concludes that the largest single new supply available for meeting expected growth in water demand over the next 25 years is water use efficiency. Other sources will increase energy demands.

Summary

Water use is increasing in San Mateo County, which in turn, increases the amount of energy used in the water process. Energy demand reduction relating to water consumption can be addressed in two ways: (1) starting with the end uses of water and identifying opportunities to incentivize change, educate the public or develop policy to address usage and (2) encouraging, requesting or requiring the water utilities to become more energy efficient and to choose self-generation options.

References for Further Information

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